



SEQUENCE LISTING

<110> Shaw, Jei-Fu
Lee, Guan-Chiun
Tang, Shye-Jye

<120> RECOMBINANT CANDIDA RUGOSA LIPASES

<130> 08919-066001

<140> 09/943,857

<141> 2001-08-31

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<212> DNA

<213> Candida rugosa

<400> 1

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ccagtgtctg	tctcccgggtg	atgctctgga	tctttggcgg	tgggtttgag	cttggcggct	300
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tccacgtgag	catgaactac	cgcgtggcgt	catgggggtt	cttggccggc	cccgaatcc	420
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cggacaacat	tgtctgggtt	ggcggcgacc	cgagcaaggt	gaccatatac	ggcgaggcgg	540
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cgtacggcac	cgagatctac	aaccaggtgg	tggcgtctgc	cgggtgtggc	agtgccagcg	720
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<211> 547

<212> PRT

<213> Candida rugosa

<400> 2

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 35 40 45
 Leu Arg Phe Lys Pro Pro Val Pro Tyr Ser Ala Ser Leu Asn Gly Gln
 50 55 60
 Gln Phe Thr Ser Tyr Gly Pro Ser Cys Met Gln Met Asn Pro Met Gly
 65 70 75 80
 Ser Phe Glu Asp Thr Leu Pro Lys Asn Ala Leu Asp Leu Val Leu Gln
 85 90 95
 Ser Lys Ile Phe Gln Val Val Leu Pro Asn Asp Glu Asp Cys Leu Thr
 100 105 110
 Ile Asn Val Ile Arg Pro Pro Gly Thr Arg Ala Ser Ala Gly Leu Pro
 115 120 125
 Val Met Leu Trp Ile Phe Gly Gly Gly Phe Glu Leu Gly Gly Ser Ser
 130 135 140
 Leu Phe Pro Gly Asp Gln Met Val Ala Lys Ser Val Leu Met Gly Lys
 145 150 155 160
 Pro Val Ile His Val Ser Met Asn Tyr Arg Val Ala Ser Trp Gly Phe
 165 170 175
 Leu Ala Gly Pro Asp Ile Gln Asn Glu Gly Ser Gly Asn Ala Gly Leu
 180 185 190
 His Asp Gln Arg Leu Ala Met Gln Trp Val Ala Asp Asn Ile Ala Gly
 195 200 205
 Phe Gly Gly Asp Pro Ser Lys Val Thr Ile Tyr Gly Glu Ser Ala Gly
 210 215 220
 Ser Met Ser Thr Phe Val His Leu Val Trp Asn Asp Gly Asp Asn Thr
 225 230 235 240
 Tyr Asn Gly Lys Pro Leu Phe Arg Ala Ala Ile Met Gln Ser Gly Cys
 245 250 255
 Met Val Pro Ser Asp Pro Val Asp Gly Thr Tyr Gly Thr Glu Ile Tyr
 260 265 270
 Asn Gln Val Val Ala Ser Ala Gly Cys Gly Ser Ala Ser Asp Lys Leu
 275 280 285
 Ala Cys Leu Arg Gly Leu Ser Gln Asp Thr Leu Tyr Gln Ala Thr Ser
 290 295 300
 Asp Thr Pro Gly Val Leu Ala Tyr Pro Ser Leu Arg Leu Ser Tyr Leu
 305 310 315 320
 Pro Arg Pro Asp Gly Thr Phe Ile Thr Asp Asp Met Tyr Ala Leu Val
 325 330 335
 Arg Asp Gly Lys Tyr Ala His Val Pro Val Ile Ile Gly Asp Gln Asn
 340 345 350
 Asp Glu Gly Thr Leu Phe Gly Leu Ser Ser Leu Asn Val Thr Thr Asp
 355 360 365
 Ala Gln Ala Arg Ala Tyr Phe Lys Gln Ser Phe Ile His Ala Ser Asp
 370 375 380
 Ala Glu Ile Asp Thr Leu Met Ala Ala Tyr Thr Ser Asp Ile Thr Gln
 385 390 395 400
 Gly Ser Pro Phe Asp Thr Gly Ile Phe Asn Ala Ile Thr Pro Gln Phe
 405 410 415
 Lys Arg Ile Ser Ala Leu Leu Gly Asp Leu Ala Phe Thr Leu Ala Arg
 420 425 430
 Arg Tyr Phe Leu Asn Tyr Tyr Gln Gly Gly Thr Lys Tyr Ser Phe Leu
 435 440 445
 Ser Lys Gln Leu Ser Gly Leu Pro Val Leu Gly Thr Phe His Gly Asn

450 455 460
 Asp Ile Ile Trp Gln Asp Tyr Leu Val Gly Ser Gly Ala Val Ile Tyr
 465 470 475 480
 Asn Asn Ala Phe Ile Ala Phe Ala Asn Asp Leu Asp Pro Asn Lys Ala
 485 490 495
 Gly Leu Trp Thr Asn Trp Pro Thr Tyr Thr Ser Ser Ser Gln Ser Gly
 500 505 510
 Asn Asn Leu Met Gln Ile Asn Gly Leu Gly Leu Tyr Thr Gly Lys Asp
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<210> 3

<211> 1532

<212> DNA

<213> Candida rugosa

<400> 3

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aaccccgagg	gcacgtttga	agagaacctt	ggcaagacgg	cactcgactt	ggtgatgcag	240
tccaaggtgt	tccaggcggt	gcttccccag	agtgaggact	gcctcaccat	caacgtggtg	300
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ctcatgggca	agccatcatc	cacgtggccg	tcaactaccg	tgttgccctg	tgggggttct	480
tggctggtga	tgacatcaag	gccgagggca	gocgggaacgc	cggttgaag	gaccagcggt	540
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accacgaatg	ctcaggccccg	tgttacttcc	aagcagttca	tccacgccag	cgacgcggag	1080
atcgacacct	tgatggcggc	gtacccccag	gacatcacc	aggggtccgtt	cgacacgggt	1140
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cccgcgcgta	cttccctcaac	cacttccagg	gocggcacca	gtactcggtc	ctcaagcagc	1260
tccgggttgc	aatcatgggc	accttccatg	ccaacgacat	tgtgtggcag	gactacttgt	1320
tgggaagcgg	cagcgtcatc	tacaacaacg	cgtttatcgc	gttcgccacc	gacttggacc	1380
ccaacaccgc	gggggtgttg	gtgaactggc	ccaagtacac	cagcagccag	ggcaacaact	1440
tgatgatgat	caacgccttg	ggcttgtaca	cgggcaagga	caacttccgc	accgctgggt	1500
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<210> 4

<211> 547

<212> PRT

<213> Candida rugosa

<400> 4

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Asn Glu Ala Phe Leu Gly Ile Pro Phe Ala Glu Pro Pro Val Gly Asn
 35 40 45
 Leu Arg Phe Lys Asp Pro Val Pro Tyr Ser Gly Ser Leu Asn Gly Gln
 50 55 60
 Lys Phe Thr Ser Tyr Gly Pro Ser Cys Met Gln Gln Asn Pro Glu Gly
 65 70 75 80
 Thr Phe Glu Glu Asn Leu Gly Lys Thr Ala Leu Asp Leu Val Met Gln
 85 90 95
 Ser Lys Val Phe Gln Ala Val Leu Pro Gln Ser Glu Asp Cys Leu Thr
 100 105 110
 Ile Asn Val Val Arg Pro Pro Gly Thr Lys Ala Gly Ala Asn Leu Pro
 115 120 125
 Val Met Leu Trp Ile Phe Gly Gly Gly Phe Glu Ile Gly Ser Pro Thr
 130 135 140
 Ile Phe Pro Pro Ala Gln Met Val Thr Lys Ser Val Leu Met Gly Lys
 145 150 155 160
 His Ile Ile His Val Ala Val Asn Tyr Arg Val Ala Ser Trp Gly Phe
 165 170 175
 Leu Ala Gly Asp Asp Ile Lys Ala Glu Gly Ser Gly Asn Ala Gly Leu
 180 185 190
 Lys Asp Gln Arg Leu Gly Met Gln Trp Val Ala Asp Asn Ile Ala Gly
 195 200 205
 Phe Gly Gly Asp Pro Ser Lys Val Thr Ile Phe Gly Glu Ser Ala Gly
 210 215 220
 Ser Met Ser Val Leu Cys His Leu Ile Trp Asn Asp Gly Asp Asn Thr
 225 230 235 240
 Tyr Lys Gly Lys Pro Leu Phe Arg Ala Gly Ile Met Gln Ser Gly Ala
 245 250 255
 Met Val Pro Ser Asp Pro Val Asp Gly Thr Tyr Gly Asn Glu Ile Tyr
 260 265 270
 Asp Leu Phe Val Ser Ser Ala Gly Cys Gly Ser Ala Ser Asp Lys Leu
 275 280 285
 Ala Cys Leu Arg Ser Ala Ser Ser Asp Thr Leu Leu Asp Ala Thr Asn
 290 295 300
 Asn Thr Pro Gly Phe Leu Ala Tyr Ser Ser Leu Arg Leu Ser Tyr Leu
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 Pro Arg Pro Asp Gly Lys Asn Ile Thr Asp Asp Met Tyr Lys Leu Val
 325 330 335
 Arg Asp Gly Lys Tyr Ala Ser Val Pro Val Ile Ile Gly Asp Gln Asn
 340 345 350
 Asp Glu Gly Thr Ile Phe Gly Leu Ser Ser Leu Asn Val Thr Thr Asn
 355 360 365
 Ala Gln Ala Arg Ala Tyr Phe Lys Gln Ser Phe Ile His Ala Ser Asp
 370 375 380
 Ala Glu Ile Asp Thr Leu Met Ala Ala Tyr Pro Gln Asp Ile Thr Gln
 385 390 395 400
 Gly Ser Pro Phe Asp Thr Gly Val Leu Asn Ala Leu Thr Pro Gln Phe
 405 410 415
 Lys Arg Ile Ser Ala Val Leu Gly Asp Leu Ala Phe Ile His Ala Arg
 420 425 430
 Arg Tyr Phe Leu Asn His Phe Gln Gly Gly Thr Lys Tyr Ser Phe Leu
 435 440 445
 Ser Lys Gln Leu Ser Gly Leu Pro Ile Met Gly Thr Phe His Ala Asn
 450 455 460
 Asp Ile Val Trp Gln Asp Tyr Leu Leu Gly Ser Gly Ser Val Ile Tyr
 465 470 475 480
 Asn Asn Ala Phe Ile Ala Phe Ala Thr Asp Leu Asp Pro Asn Thr Ala

485 490 495
 Gly Leu Leu Val Asn Asp Pro Lys Tyr Thr Ser Ser Ser Gln Ser Gly
 500 505 510
 Asn Asn Leu Met Met Ile Asn Ala Leu Gly Leu Tyr Thr Gly Lys Asp
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 <213> Candida rugosa

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 cggccgggca ccaagccggg tgccaacctc ccgctgatgg tgtggatttt tggcggcggg 360
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 gcagccaggg caacaacttg ttgcagatca acgccttggg cttgtacacc ggcaaggaca 1500
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 <213> Candida rugosa

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 35 40 45
 Leu Arg Phe Lys Pro Pro Val Pro Tyr Ser Ala Ser Leu Asn Gly Gln
 50 55 60

Lys Phe Thr Ser Tyr Gly Pro Ser Tyr Met Gln Met Asn Pro Leu Gly
 65 70 80
 Asn Trp Asp Ser Ser Leu Pro Lys Ala Ala Ile Asn Ser Leu Met Gln
 85 90 95
 Ser Lys Leu Phe Gln Ala Val Leu Pro Asn Gly Glu Asp Cys Leu Thr
 100 105 110
 Ile Asn Val Val Arg Pro Ser Gly Thr Lys Pro Gly Ala Asn Leu Pro
 115 120 125
 Val Met Val Trp Ile Phe Gly Gly Gly Phe Glu Val Gly Gly Ser Ser
 130 135 140
 Leu Phe Pro Pro Ala Gln Met Ile Thr Ala Ser Val Leu Met Gly Lys
 145 150 155 160
 Pro Ile Ile His Val Ser Met Asn Tyr Arg Val Ala Ser Trp Gly Phe
 165 170 175
 Leu Ala Gly Pro Asp Ile Lys Ala Glu Gly Ser Gly Asn Ala Gly Leu
 180 185 190
 His Asp Gln Arg Leu Gly Leu Gln Trp Val Ala Asp Asn Ile Ala Gly
 195 200 205
 Phe Gly Gly Asp Pro Ser Lys Val Thr Ile Phe Gly Glu Ser Ala Gly
 210 215 220
 Ser Met Ser Val Met Cys Gln Leu Leu Trp Asn Asp Gly Asp Asn Thr
 225 230 235 240
 Tyr Asn Gly Lys Pro Leu Phe Arg Ala Ala Ile Met Gln Ser Gly Ala
 245 250 255
 Met Val Pro Ser Asp Pro Val Asp Gly Pro Tyr Gly Thr Gln Ile Tyr
 260 265 270
 Asp Gln Val Val Ala Ser Ala Gly Cys Gly Ser Ala Ser Asp Lys Leu
 275 280 285
 Ala Cys Leu Arg Ser Ile Ser Asn Asp Lys Leu Phe Gln Ala Thr Ser
 290 295 300
 Asp Thr Pro Gly Ala Leu Ala Tyr Pro Ser Leu Arg Leu Ser Phe Leu
 305 310 315 320
 Pro Arg Pro Asp Gly Thr Phe Ile Thr Asp Asp Met Phe Lys Leu Val
 325 330 335
 Arg Asp Gly Lys Cys Ala Asn Val Pro Val Ile Ile Gly Asp Gln Asn
 340 345 350
 Asp Glu Gly Thr Val Phe Ala Leu Ser Ser Leu Asn Val Thr Thr Asp
 355 360 365
 Ala Gln Ala Arg Gln Tyr Phe Lys Glu Ser Phe Ile His Ala Ser Asp
 370 375 380
 Ala Glu Ile Asp Thr Leu Met Ala Ala Tyr Pro Ser Asp Ile Thr Gln
 385 390 395 400
 Gly Ser Pro Phe Asp Thr Gly Ile Phe Asn Ala Ile Thr Pro Gln Phe
 405 410 415
 Lys Arg Ile Ala Ala Val Leu Gly Asp Leu Ala Phe Thr Leu Pro Arg
 420 425 430
 Arg Tyr Phe Leu Asn His Phe Gln Gly Gly Thr Lys Tyr Ser Phe Leu
 435 440 445
 Ser Lys Gln Leu Ser Gly Leu Pro Val Ile Gly Thr His His Ala Asn
 450 455 460
 Asp Ile Val Trp Gln Asp Phe Leu Val Ser His Ser Ser Ala Val Tyr
 465 470 475 480
 Asn Asn Ala Phe Ile Ala Phe Ala Asn Asp Leu Asp Pro Asn Lys Ala
 485 490 495
 Gly Leu Leu Val Asn Trp Pro Lys Tyr Thr Ser Ser Ser Gln Ser Gly
 500 505 510
 Asn Asn Leu Leu Gln Ile Asn Ala Leu Gly Leu Tyr Thr Gly Lys Asp

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 530 535 540
 Phe Phe Val
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 <213> Candida rugosa

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<210> 8
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 <212> PRT
 <213> Candida rugosa

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 35 40 45
 Leu Arg Phe Lys Asp Pro Val Pro Tyr Arg Gly Ser Leu Asn Gly Gln
 50 55 60
 Ser Phe Thr Ala Tyr Gly Pro Ser Cys Met Gln Gln Asn Pro Glu Gly
 65 70 75 80
 Thr Tyr Glu Glu Asn Leu Pro Lys Val Ala Leu Asp Leu Val Met Gln
 85 90 95

Ser Lys Val Phe Gln Ala Val Leu Pro Asn Ser Glu Asp Cys Leu Thr
 100 105 110
 Ile Asn Val Val Arg Pro Pro Gly Thr Lys Ala Gly Ala Asn Leu Pro
 115 120 125
 Val Met Leu Trp Ile Phe Gly Gly Phe Glu Ile Gly Ser Pro Thr
 130 135 140
 Ile Phe Pro Pro Ala Gln Met Val Ser Lys Ser Val Leu Met Gly Glu
 145 150 155 160
 Pro Ile Ile His Val Ala Val Asn Tyr Arg Leu Ala Ser Phe Gly Phe
 165 170 175
 Leu Ala Gly Pro Asp Ile Lys Ala Glu Gly Ser Ser Asn Ala Gly Leu
 180 185 190
 Lys Asp Gln Arg Leu Gly Met Gln Trp Val Ala Asp Asn Ile Ala Gly
 195 200 205
 Phe Gly Gly Asp Pro Ser Lys Val Thr Ile Phe Gly Glu Ser Ala Gly
 210 215 220
 Ser Met Ser Val Leu Cys His Leu Leu Trp Asn Gly Gly Asp Asn Thr
 225 230 235 240
 Tyr Lys Gly Lys Pro Leu Phe Arg Ala Gly Ile Met Gln Ser Gly Ala
 245 250 255
 Met Val Pro Ser Asp Pro Val Asp Gly Thr Tyr Gly Ala Gln Ile Tyr
 260 265 270
 Asp Thr Leu Val Ala Ser Thr Gly Cys Ser Ser Ala Ser Asn Lys Leu
 275 280 285
 Ala Cys Leu Arg Gly Leu Ser Thr Gln Ala Leu Leu Asp Ala Thr Asn
 290 295 300
 Asp Thr Pro Gly Phe Leu Ser Tyr Thr Ser Leu Arg Leu Ser Tyr Leu
 305 310 315 320
 Pro Arg Pro Asp Gly Ala Asn Ile Thr Asp Asp Met Tyr Lys Leu Val
 325 330 335
 Arg Asp Gly Lys Tyr Ala Ser Val Pro Val Ile Ile Gly Asp Gln Asn
 340 345 350
 Asp Glu Gly Phe Leu Phe Asp Leu Ser Ser Leu Asn Thr Thr Thr Glu
 355 360 365
 Ala Asp Ala Glu Ala Tyr Leu Arg Lys Ser Phe Ile His Ala Thr Asp
 370 375 380
 Ala Asp Ile Thr Ala Leu Lys Ala Ala Tyr Pro Ser Asp Val Thr Gln
 385 390 395 400
 Gly Ser Pro Phe Asp Thr Gly Ile Leu Asn Ala Leu Thr Pro Gln Leu
 405 410 415
 Lys Arg Ile Asn Ala Val Leu Gly Asp Leu Thr Phe Thr Leu Ser Arg
 420 425 430
 Arg Tyr Phe Leu Asn His Tyr Thr Gly Gly Pro Lys Tyr Ser Phe Leu
 435 440 445
 Ser Lys Gln Leu Ser Gly Leu Pro Ile Leu Gly Thr Phe His Ala Asn
 450 455 460
 Asp Ile Val Trp Gln His Phe Leu Leu Gly Ser Gly Ser Val Ile Tyr
 465 470 475 480
 Asn Asn Ala Phe Ile Ala Phe Ala Thr Asp Leu Asp Pro Asn Thr Ala
 485 490 495
 Gly Leu Ser Val Gln Trp Pro Lys Tyr Thr Ser Ser Ser Gln Ala Gly
 500 505 510
 Asp Asn Leu Met Gln Ile Ser Ala Leu Gly Leu Tyr Thr Gly Lys Asp
 515 520 525
 Asn Phe Arg Thr Ala Gly Tyr Asn Ala Leu Phe Ala Asp Pro Ser His
 530 535 540
 Phe Phe Val

545

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<213> *Candida rugosa*

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<213> *Candida rugosa*

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Asn Glu Ala Phe Leu Gly Ile Pro Phe Ala Glu Pro Pro Val Gly Asn
 35             40             45
Leu Arg Phe Lys Asp Pro Val Pro Tyr Ser Gly Ser Leu Asp Gly Gln
 50             55             60
Lys Phe Thr Ser Tyr Gly Pro Ser Cys Met Gln Gln Asn Pro Glu Gly
 65             70             75             80
Thr Tyr Glu Glu Asn Leu Pro Lys Ala Ala Leu Asp Leu Val Met Gln
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Ser Lys Val Phe Glu Ala Val Ser Pro Ser Ser Glu Asp Cys Leu Thr
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 Phe Gly Gly Asp Pro Thr Lys Val Thr Ile Phe Gly Glu Ser Ala Gly
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 Ala Cys Leu Arg Gly Val Ser Ser Asp Thr Leu Glu Asp Ala Thr Asn
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 Pro Arg Pro Asp Gly Val Asn Ile Thr Asp Asp Met Phe Ala Leu Val
 325 330 335
 Arg Glu Gly Lys Tyr Ala Ser Val Pro Val Ile Ile Gly Asp Gln Asn
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 Asp Glu Gly Thr Phe Phe Gly Thr Ser Ser Leu Asn Val Thr Thr Asp
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 370 375 380
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 Gly Ser Pro Phe Asp Thr Gly Val Leu Asn Ala Leu Thr Pro Gln Phe
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 Lys Arg Ile Ser Ala Val Leu Gly Asp Leu Ala Phe Ile His Ala Arg
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 Arg Tyr Phe Leu Asn His Tyr Thr Gly Gly Thr Lys Tyr Ser Phe Leu
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 Gly Leu Leu Val Lys Trp Pro Glu Tyr Thr Ser Ser Ser Gln Ser Gly
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2125 PRT

2135 Candida rugosa

4005 11

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